

ROOFING FOR HISTORIC BUILDINGS

Clay Tile

The origins of clay tile can be found in both China and the Near East, with surviving artifacts of roofing tile dating to 2,500 BC. From these locations, it spread throughout Asia and Europe. European settlers brought this tradition to the New World, and



The tile roof on Stadt Huys (City Hall), New Amsterdam may have been imported, but by the time of its construction in 1641-42 tile was probably available from a tile yard up the Hudson in Rensselaerwyk. (Image courtesy of the Museum of the City of New York)

the earliest settlements like those on Roanoke Island in North Carolina, Jamestown in Virginia, and St. Marys in Maryland have yielded specimens of roof tiles from archeological investigations. Tile was also used very early by the Spanish and French in the South and West.

Both time and place are important determinants in the history of tile roofing in America. Tiles were first imported, but by 1650 they were being produced in the upper

Hudson River Valley, and several factories were in operation at the time of the American Revolution. Fire was probably the single most important factor in popularizing tile for roofing in this country. Devastating urban fires in the 17th century prompted regulations that encouraged the use of tile as a fireproof roofing. The use of tile roofing began to decline during the first quarter of the 19th century as new fire resistant materials became available and tile roofs were viewed as clumsy and unattractive. However, by the middle of the 19th century, the popularity of revival styles, particularly Italianate, Gothic, and Romanesque, created new interest in tile roofs.

The development of architectural terra cotta as a significant building material, the mechanization of tile production and the growth of rail transport aided a gradual resurgence of tile roofing. It was during the first few decades of the 20th century that the revival styles, drawn from the Mediterranean and the American Southwest, gave tile its broadest use. Today tile can most commonly be found in the Southwest and coastal South where its suits both the popular architectural images and regional climates.



The barrel tile roof on Vizcaya contributes to the image of an Italian Renaissance palace so grandly realized in this Miami, Florida mansion completed in 1916.

Tiles are distinguished by their shape and the way they overlap. The simplest are flat tile laid like shingles with staggered joints and less than half their surface exposed to weather. A tile system made up of alternating convex and concave or flat surfaces, generally referred to as pantile, may be formed by separate tiles (Barrel, Mission, Greek, Roman) or a single S-shaped tile (Spanish). These are laid with less overlap of each

course than a shingle tile but include a side to side overlap. Interlocking tiles have mated ridges and grooves at their edges, thereby reducing the amount of overlap needed to achieve a weathertight surface. Reducing the lap decreases overall weight of the roof and the need for heavier framing. The interlocking feature was only practical with the precision brought by late 19th century

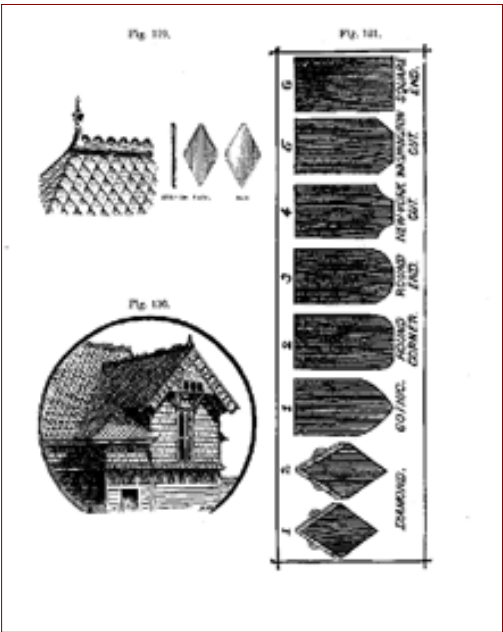


Manufacturing

Roofing tile begins as raw clay that is processed by drying, pulverizing, mixing with water and kneading. It is then shaped into tiles, dried and fired. In the latter half of the 19th century mechanization was introduced incrementally to what was largely a manual operation. Even as steam power was applied to the rollers that pulverized the clay and the pug mill that mixed and kneaded it, clay continued to be pressed into molds by hand. In the 1870s machines were developed that delivered and mechanically pressed slices of clay into a mold. The installation of such presses at the Celadon plant in Alfred, New York, reportedly increased daily production tenfold. Other advances allowed shapes such as a shingle or barrel tile to be cut directly from extrusions, a process commonly used today.



The kilns depicted in this drawing from an 1876 atlas have been loaded with tile and the open ends walled up with bricks. Fires for such kilns were lighted and kept slowly burning for the first five hours, and then progressively increased for the next thirty-three hours. Toward the end of the firing, the mouths of the kiln were stopped with ashes to prevent the flow of air from cooling the oven too quickly. A typical kiln consumed approximately four tons of coal per firing to produce hard fired tiles. (click image for larger view)

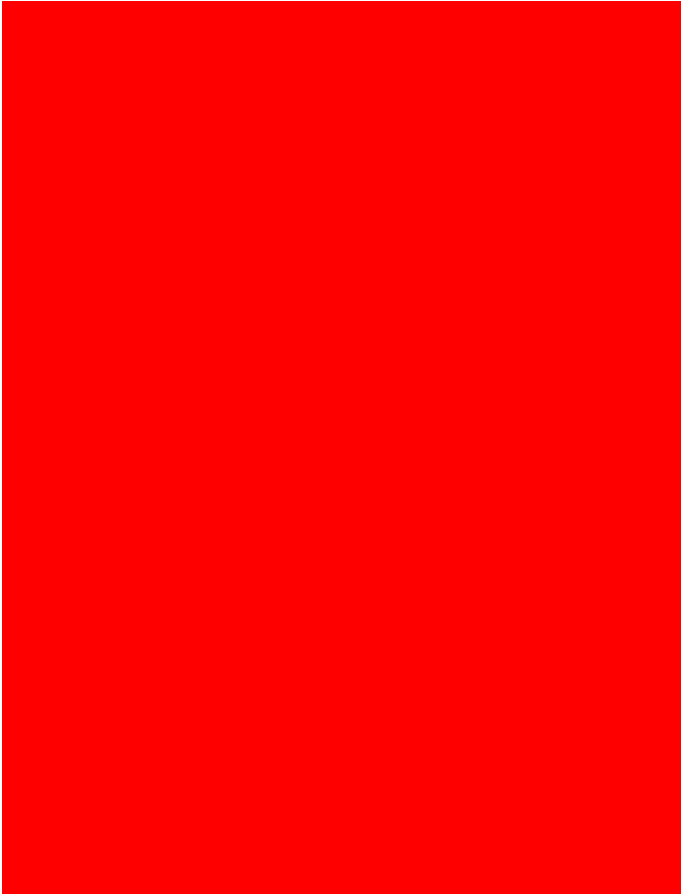


Outside of the Southwest, these tiles depicted in an 1884 publication are typical of what were in common use at that time. The diamond is an interlocking tile while the others are simply shingle tiles with shaped butts. [click image for larger view]

advances in manufacturing. It became common for most flat tiles as well as surface grooved French tiles and is also a feature of some pantiles.

Most clay tiles are nailed or wired to sheathing or battens, but lugs on the back of some tiles allow the weight of the tile itself to hold it in place on low slope roofs. Mortar is sometimes added, particularly on pantiles, to hold tile in place and make the system more watertight and wind resistant. The barrel tiles of the southwest were historically laid in a full bed of mud mortar without additional fasteners. Tile as a material often outlasts its attachments, if not the building itself, a point made in an 1884 treatise, Bricks, Tile, Terra Cotta, Etc.: "After

doing service on one structure it can be taken off and used on other buildings."



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